Trend Study 17-47-02

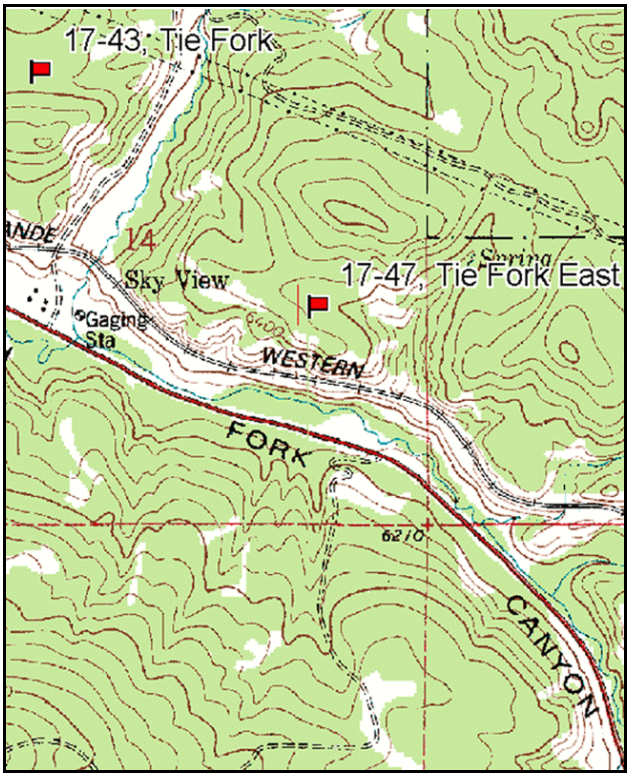
Study site name: Tie Fork East . Vegetation type: Mountain Brush .

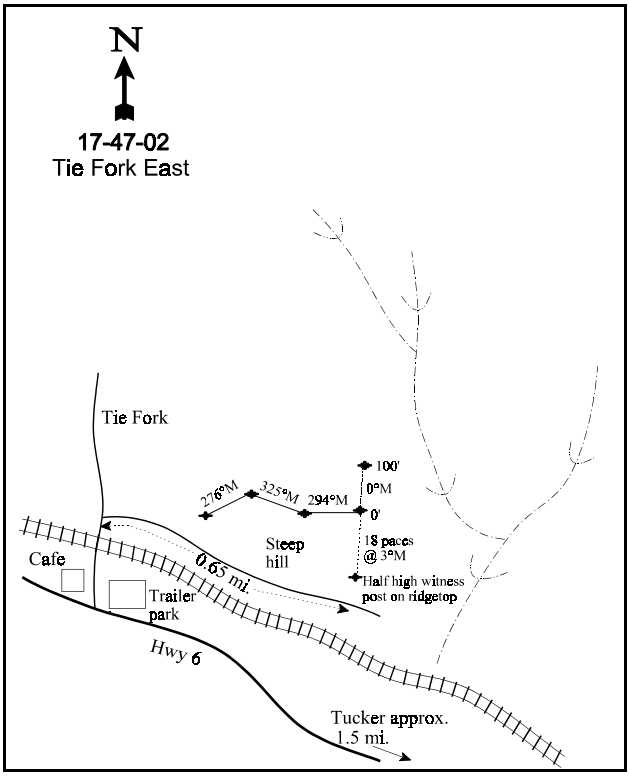
Compass bearing: frequency baseline 0 degrees magnetic (line 2 @ 294°M, line 3 @ 325°M, line 4 @ 286°M).

Frequency belt placement: line 1 (11 & 95 ft), line 2 (59 ft), line 3 (34 ft), line 4 (71 ft). Rebar: belt 3 on 1ft.

LOCATION DESCRIPTION

From the intersection of Highway U.S. 6 and Tie Fork at Sky View in Spanish Fork Canyon, go north up to the railroad tracks. Cross the tracks and turn right. Follow the road along the railroad tracks for 0.65 miles. Stop at a pullout at the mouth of a small side canyon. Walk up the ridge to the west 200 yards to a witness post in a small rock outcrop on the bare ridgetop, by some mahogany. From the witness post, walk 18 paces north (3 degrees) to the 0-foot baseline stake.




Map Name: Tucker

Diagrammatic Sketch

Township 10S , Range 6E , Section 14

GPS: NAD 27, UTM 12S 4421995 N 482213 E

## DISCUSSION

### Tie Fork East - Trend Study No. 17-47

The Tie Fork range trend study (17-43) was established in the Tie Fork area in 1983. However, since the site was not considered representative of the large critical wintering area in Tie Fork, this study was established in 1989. The new study is on a more xeric site, supporting less oak and pinyon on a moderately steep slope. The area supports a scattered juniper community with a mountain brush understory. This site would be more representative of the winter range in the area. The lower end of Tie Fork is private land along the railroad. No livestock are currently grazed in the area but sheep are thought to trail through. The area receives considerably heavy winter use by deer, with light to moderate use by elk. Quadrat frequency of deer pellet groups was moderate in 1997 and 2002 at 38% and 33% respectively. A pellet group transect read on site in 2002 estimated 76 deer and 8 elk days use/acre (187 ddu/ha and 20 edu/ha). All of the deer and elk pellet groups appear to be from winter use.

This study is on a north facing slope at an elevation of 6,440 feet. The slope varies between 10% and 20%. Litter and organic matter buildup is good beneath shrub and tree crowns and combined with vegetative cover, helps to reduce erosion. However, there are still areas of localized erosion with active gullies forming below the site. The soil erosion condition class was determined to be slight in 2002. The soil is light gray in color and lacks structure. Soil textural analysis indicates a clay loam with a neutral reaction (pH 7.3). The effective rooting depth is 16 inches. Phosphorous is marginal at 8.3 ppm as values less than 10 ppm could be limiting to plant growth and development.

The browse community is a combination of large juniper and pinyon in association with an important shrub understory. The more prevalent juniper are largely unavailable due to height and past high-lining. Juniper rees average 25 to 30 feet in height with smaller trees in the understory. Density was estimated at 174 trees/acre in 2002 from point-center quarter data. Diameter of juniper averaged nearly 8 inches. Pinyon are less common on this site with a density of 30 trees/acre estimated in 2002. Juniper and pinyon canopy cover is variable but averaged almost 5% for juniper and nearly 2% for pinyon over the whole site.

Several preferred forage species occur in the understory including serviceberry, mountain big sagebrush, true mountain mahogany, and bitterbrush. Saskatoon serviceberry density was estimated about 300 plants/acre in 1997 and 2002. It displayed heavy use in 2002, although vigor was normal. True mountain mahogany is the most abundant palatable species. Density was estimated at 700 plants/acre in 2002. Utilization has been consistently heavy since 1989, yet most plants have good vigor. The number of decadent plants has ranged from 11% in 1997 to 23% in 2002.

Sagebrush on the site has some characteristics of basin big sagebrush (*Artemisia tridentata tridentata*) but was classified as Mountain big sagebrush *(Artemisia tridentata vaseyana*) in 2002. It had a low density estimated at only 260 plants/acre in 2002. Utilization was moderate to heavy in 1997 and 2002 and the number of decadent plants was moderately high at 50% and 38% respectively. Bitterbrush are highly preferred but only a few heavily utilized plants occur on the site.

Snowberry is abundant but less preferred. It had a density estimated at 5,300 plants/acre with mostly light utilization in 1997. Density increased to 6,200 plants/acre in 2002, and use continued to be mostly light. A few oak clones occur on site. These average about three feet in height with light to moderate use on available plants. Other scattered browse species include white rubber rabbitbrush, stickyleaf rabbitbrush, Wood's rose, and gray horsebrush.

Total herbaceous cover is relatively low on this site with grasses and forbs providing only 9% cover in 2002. The most abundant grasses are Indian ricegrass, a *Carex*, and bluebunch wheatgrass. Indian ricegrass and *Carex* remained at stable frequencies in 2002, but bluebunch wheatgrass significantly declined. Cheatgrass is present but not in high amounts. Forb cover is sparse with high diversity but low abundance. Several annual species were encountered, with many of the species being increasers or invaders including musk thistle.

1989 APPARENT TREND ASSESSMENT

With continued soil loss and no signs of an increasing understory or herbaceous component, the soil trend appears to be declining. The vegetative trend also has some downward indicators such as increasing juniper and continued heavy use of the preferred browse. Still, there is fair reproduction and significant amounts of unutilized browse forage (especially on the sagebrush).

1997 TREND ASSESSMENT

Erosion is still apparent, but is not excessive. This vegetative type will likely always have some erosion occurring, so establishment of herbaceous understory should be encouraged. Soil trend is up slightly due to a decline in bare ground and an increase in the sum of nested frequency for grasses and forbs. The browse trend is stable. There is little change in any of the browse species. The mountain big sagebrush population is 50% decadent with similar utilization and vigor as reported in 1989. It is still only a minor component of the browse composition at this time. True mountain mahogany has remained stable with moderate to heavy use, good vigor, and low decadence. The herbaceous understory trend is slightly upward with an increase in nested frequency for both perennial grasses and forbs.

TREND ASSESSMENT
soil - up slightly (4)
browse - stable (3)
herbaceous understory - slightly upward (4)

2002 TREND ASSESSMENT

Trend for soil is down slightly. Cover of bare ground has increased from 15% to 25%, while litter cover has declined slightly. In addition, total herbaceous cover has declined from 14% to 9% and the sum of nested frequency for perennial grasses and forbs has declined. Current erosion is occurring but it is not severe and the erosion condition class was determined to be slight. Trend for browse is stable but showing the effects of drought. Serviceberry, mountain big sagebrush, and true mountain mahogany are the key browse species. Densities have remained relatively stable while use is more heavy. Sagebrush and mahogany display increased poor vigor and the number of decadent mahogany has increased from 11% to 23%. However, recruitment appears adequate to maintain their respective populations. Annual leader growth for mahogany was estimated at only 1.6 inches. Most plants showed little growth and many terminal buds were shriveling up by July 3rd due to the dry conditions. Trend for the herbaceous understory is down slightly. Sum of nested frequency for perennial grasses and forbs has declined and frequency of bluebunch wheatgrass declined significantly. The other abundant perennial grass, Indian ricegrass, has remained stable. Nested frequency of the most abundant forb, Wasatch penstemon, also declined significantly. Another negative indicator with respect to the herbaceous understory is the continued increase in cover of juniper.

TREND ASSESSMENT
soil - down slightly (2)
browse - stable (3)
herbaceous understory - down slightly (2)

HERBACEOUS TRENDS --
Herd unit 17 , Study no: 47

| Type | Species | Nested Frequency | | | Quadrat Frequency | | | Average Cover % | |
|---|---|---|---|---|---|---|---|---|---|
| | | '89 | '97 | '02 | '89 | '97 | '02 | '97 | '02 |
| G | Agropyron spicatum | $_{a}$8 | $_{b}$42 | $_{a}$12 | 3 | 20 | 5 | 2.20 | .31 |
| G | Bromus tectorum (a) | - | $_{b}$101 | $_{a}$11 | - | 38 | 5 | .48 | .03 |
| G | Carex spp. | $_{a}$6 | $_{ab}$25 | $_{b}$34 | 4 | 11 | 13 | 1.14 | .78 |
| G | Oryzopsis hymenoides | $_{b}$121 | $_{a}$77 | $_{a}$77 | 49 | 30 | 33 | 3.03 | 3.55 |
| G | Poa fendleriana | - | - | 4 | - | - | 2 | - | .16 |
| G | Poa pratensis | 24 | 19 | 10 | 8 | 7 | 5 | .13 | .10 |
| G | Poa secunda | - | 6 | - | - | 2 | - | .30 | - |
| G | Sitanion hystrix | 7 | 16 | 11 | 4 | 7 | 6 | .13 | .14 |
| G | Stipa columbiana | 10 | 7 | 8 | 3 | 3 | 3 | .41 | .04 |
| G | Stipa lettermani | $_{a}$1 | $_{b}$20 | $_{ab}$8 | 1 | 8 | 3 | .67 | .21 |
| Total for Annual Grasses | | 0 | 101 | 11 | 0 | 38 | 5 | 0.48 | 0.03 |
| Total for Perennial Grasses | | 177 | 212 | 164 | 72 | 88 | 70 | 8.05 | 5.30 |
| Total for Grasses | | 177 | 313 | 175 | 72 | 126 | 75 | 8.53 | 5.33 |
| F | Achillea millefolium | 5 | 6 | 4 | 2 | 2 | 2 | .18 | .01 |
| F | Agoseris glauca | - | 1 | 11 | - | 1 | 4 | .00 | .02 |
| F | Antennaria rosea | 7 | 7 | - | 2 | 2 | - | .41 | - |
| F | Astragalus convallarius | 3 | 8 | 10 | 2 | 5 | 5 | .02 | .08 |
| F | Castilleja linariaefolia | 2 | - | 4 | 2 | - | 2 | .01 | .03 |
| F | Carduus nutans (a) | $_{a}$- | $_{b}$13 | $_{b}$23 | - | 7 | 11 | .42 | .30 |
| F | Chenopodium album (a) | - | 1 | - | - | 1 | - | .00 | - |
| F | Chaenactis douglasii | 7 | 4 | - | 4 | 2 | - | .03 | - |
| F | Cirsium spp. | 4 | 21 | 2 | 4 | 11 | 1 | .28 | .03 |
| F | Collinsia parviflora (a) | - | 13 | 8 | - | 6 | 3 | .03 | .01 |
| F | Cryptantha spp. | 4 | 1 | 12 | 2 | 1 | 6 | .03 | .22 |
| F | Cynoglossum officinale | $_{c}$107 | $_{b}$50 | $_{a}$2 | 43 | 19 | 1 | .99 | .00 |
| F | Delphinium nuttallianum | - | 1 | - | - | 1 | - | .00 | - |
| F | Descurainia pinnata (a) | $_{a}$- | $_{b}$29 | $_{a}$2 | - | 13 | 1 | .09 | .00 |
| F | Epilobium brachycarpum (a) | - | 3 | 4 | - | 1 | 2 | .00 | .03 |
| F | Erigeron spp. | - | 2 | - | - | 2 | - | .01 | - |
| F | Gayophytum ramosissimum (a) | - | - | 1 | - | - | 1 | - | .03 |
| F | Hackelia patens | $_{a}$- | $_{b}$16 | $_{b}$21 | - | 7 | 11 | .41 | .44 |
| F | Lappula occidentalis (a) | - | 1 | - | - | 1 | - | .00 | - |
| F | Lactuca serriola | - | - | 2 | - | - | 1 | - | .00 |
| F | Lithospermum ruderale | - | - | 2 | - | - | 1 | - | .06 |
| F | Machaeranthera canescens | 11 | 27 | 9 | 6 | 12 | 6 | .13 | .03 |
| F | Melilotus officinalis | - | 1 | - | - | 1 | - | .00 | - |
| F | Penstemon cyananthus | $_{a}$58 | $_{b}$101 | $_{a}$69 | 29 | 43 | 31 | 1.96 | 2.35 |

| Type | Species | Nested Frequency | | | Quadrat Frequency | | | Average Cover % | |
|---|---|---|---|---|---|---|---|---|---|
| | | '89 | '97 | '02 | '89 | '97 | '02 | '97 | '02 |
| F | Penstemon humilis | $_{b}$16 | $_{a}$- | $_{a}$2 | 6 | - | 1 | - | .03 |
| F | Phlox hoodii | - | - | 1 | - | - | 1 | - | .00 |
| F | Phlox longifolia | 3 | 3 | - | 1 | 2 | - | .01 | - |
| F | Ranunculus testiculatus (a) | - | 3 | 3 | - | 1 | 1 | .00 | .00 |
| F | Schoencrambe linifolia | $_{a}$- | $_{b}$16 | $_{ab}$9 | - | 9 | 4 | .16 | .04 |
| F | Senecio multilobatus | 3 | 2 | - | 1 | 1 | - | .03 | - |
| F | Streptanthus cordatus | - | - | - | - | - | - | .00 | - |
| F | Taraxacum officinale | - | 2 | - | - | 1 | - | .00 | - |
| F | Tragopogon dubius | - | 6 | 3 | - | 4 | 2 | .04 | .01 |
| F | Unknown forb-perennial | 3 | - | - | 1 | - | - | - | - |
| F | Verbascum thapsus | - | 7 | 4 | - | 3 | 2 | .07 | .18 |
| Total for Annual Forbs | | 0 | 63 | 41 | 0 | 30 | 19 | 0.56 | 0.39 |
| Total for Perennial Forbs | | 233 | 282 | 167 | 105 | 129 | 81 | 4.82 | 3.57 |
| Total for Forbs | | 233 | 345 | 208 | 105 | 159 | 100 | 5.39 | 3.97 |

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Herd unit 17 , Study no: 47

| Type | Species | Strip Frequency | | Average Cover % | |
|---|---|---|---|---|---|
| | | '97 | '02 | '97 | '02 |
| B | Amelanchier alnifolia | 13 | 9 | .21 | .09 |
| B | Artemisia tridentata vaseyana | 8 | 8 | .45 | .36 |
| B | Cercocarpus montanus | 22 | 26 | 2.58 | 2.12 |
| B | Chrysothamnus nauseosus albicaulis | 1 | 2 | - | .00 |
| B | Chrysothamnus viscidiflorus viscidiflorus | 4 | 8 | .06 | .06 |
| B | Juniperus osteosperma | 10 | 12 | 2.23 | 4.59 |
| B | Mahonia repens | 1 | 1 | - | - |
| B | Opuntia spp. | 3 | 1 | - | - |
| B | Pinus edulis | 0 | 2 | - | - |
| B | Purshia tridentata | 1 | 0 | .01 | - |
| B | Quercus gambelii | 9 | 8 | 2.01 | 1.16 |
| B | Ribes spp. | 0 | 1 | - | - |
| B | Rosa woodsii | 11 | 12 | .57 | .22 |
| B | Symphoricarpos oreophilus | 58 | 67 | 11.46 | 13.06 |
| B | Tetradymia canescens | 2 | 3 | - | .15 |
| Total for Browse | | 143 | 160 | 19.61 | 21.84 |

CANOPY COVER -- LINE INTERCEPT
Herd unit 17 , Study no: 47

| Species | Percent Cover | |
|---|---|---|
| | '97 | '02 |
| Amelanchier utahensis | - | .08 |
| Artemisia tridentata vaseyana | - | .25 |
| Cercocarpus montanus | - | 2.67 |
| Chrysothamnus viscidiflorus viscidiflorus | - | .42 |
| Juniperus osteosperma | 5.8 | 4.42 |
| Pinus edulis | 2.0 | 1.58 |
| Quercus gambelii | 4.4 | 2.00 |
| Rosa woodsii | - | .07 |
| Symphoricarpos oreophilus | - | 18.33 |

Key Browse Annual Leader Growth
Herd unit 17 , Study no: 47

| Species | Average leader growth (in) |
|---|---|
| | '02 |
| Cercocarpus montanus | 1.6 |

Point-Quarter Tree Data
Herd unit 17, Study no: 47

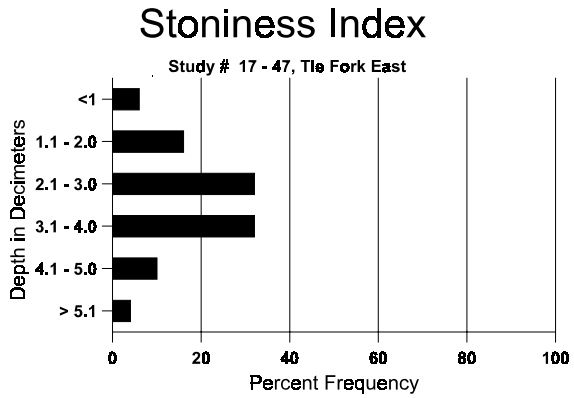
| Species | Trees per Acre | | Average diameter (in) | |
|---|---|---|---|---|
| | '97 | '02 | '97 | '02 |
| Juniperus osteosperma | 106 | 174 | 8.9 | 7.8 |
| Pinus edulis | 22 | 30 | 8.8 | 4.8 |

BASIC COVER --
Herd unit 17 , Study no: 47

| Cover Type | Nested Frequency | | Average Cover % | | |
|---|---|---|---|---|---|
| | '97 | '02 | '89 | '97 | '02 |
| Vegetation | 314 | 244 | 7.25 | 31.06 | 31.76 |
| Rock | 115 | 155 | 2.25 | 4.31 | 4.36 |
| Pavement | 176 | 187 | 13.50 | 4.74 | 8.36 |
| Litter | 395 | 379 | 50.50 | 50.47 | 48.48 |
| Cryptogams | 39 | 58 | 0 | .70 | 3.32 |
| Bare Ground | 203 | 277 | 26.50 | 15.30 | 24.68 |

SOIL ANALYSIS DATA --
Herd Unit 17, Study no: 47, Tie Fork East

| Effective rooting depth (in) | Temp °F (depth) | pH | %sand | %silt | %clay | %0M | PPM P | PPM K | dS/m |
|---|---|---|---|---|---|---|---|---|---|
| 16.1 | 45.4 (15.4) | 7.3 | 26.7 | 34.4 | 38.8 | 4.5 | 8.3 | 112.0 | .5 |




PELLET GROUP FREQUENCY --
Herd unit 17 , Study no: 47

| Type | Quadrat Frequency | |
|---|---|---|
| | '97 | '02 |
| Sheep | - | 1 |
| Rabbit | 23 | 21 |
| Elk | 12 | 3 |
| Deer | 38 | 33 |

| Pellet Transect | |
|---|---|
| Pellet Groups per Acre | Days Use per Acre (ha) |
| 02 | 02 |
| - | - |
| - | - |
| 104 | 8 (20) |
| 983 | 76 (187) |

BROWSE CHARACTERISTICS --
Herd unit 17 , Study no: 47

| AGE | YR | Form Class (No. of Plants) 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Vigor Class 1 | 2 | 3 | 4 | Plants Per Acre | Average (inches) Ht. | Cr. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Amelanchier alnifolia | | | | | | | | | | | | | | | | | | |
| Y | 89 | 2 | - | - | 4 | - | - | 1 | - | - | 7 | - | - | - | 233 | | | 7 |
| | 97 | 9 | - | - | 4 | - | - | - | - | - | 13 | - | - | - | 260 | | | 13 |
| | 02 | - | - | 1 | 5 | - | - | - | - | - | 6 | - | - | - | 120 | | | 6 |
| M | 89 | - | - | 1 | 2 | - | - | - | - | - | 3 | - | - | - | 100 | 27 | 20 | 3 |
| | 97 | - | - | - | - | 1 | 1 | - | - | - | 2 | - | - | - | 40 | 26 | 29 | 2 |
| | 02 | - | - | 3 | 4 | 1 | - | - | - | - | 8 | - | - | - | 160 | 22 | 18 | 8 |
| D | 89 | - | 1 | - | - | 2 | - | - | - | - | 2 | - | - | 1 | 100 | | | 3 |
| | 97 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| X | 89 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 97 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 20 | | | 1 |

| % Plants Showing | Moderate Use | Heavy Use | Poor Vigor | %Change |
|---|---|---|---|---|
| '89 | 23% | 08% | 08% | -31% |
| '97 | 07% | 07% | 00% | - 7% |
| '02 | 07% | 29% | 00% | |

| Total Plants/Acre (excluding Dead & Seedlings) | | | | |
|---|---|---|---|---|
| '89 | 433 | Dec: | | 23% |
| '97 | 300 | | | 0% |
| '02 | 280 | | | 0% |

| Artemisia tridentata vaseyana | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S | 89 | 1 | - | - | 1 | - | - | - | - | - | 2 | - | - | - | 66 | | | 2 |
| | 97 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| Y | 89 | 4 | - | - | 1 | - | - | - | - | - | 5 | - | - | - | 166 | | | 5 |
| | 97 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 02 | 2 | - | - | - | - | - | - | - | - | 2 | - | - | - | 40 | | | 2 |
| M | 89 | 3 | - | - | - | - | - | - | - | - | 3 | - | - | - | 100 | 20 | 10 | 3 |
| | 97 | 1 | 2 | 1 | - | - | - | - | - | - | 4 | - | - | - | 80 | 27 | 32 | 4 |
| | 02 | 4 | 1 | 1 | - | - | - | - | - | - | 6 | - | - | - | 120 | 23 | 31 | 6 |
| D | 89 | 5 | 1 | 1 | - | - | - | - | - | - | 6 | - | - | 1 | 233 | | | 7 |
| | 97 | 2 | 1 | - | 1 | - | - | - | - | - | 3 | - | - | 1 | 80 | | | 4 |
| | 02 | - | 3 | 2 | - | - | - | - | - | - | 2 | - | - | 3 | 100 | | | 5 |
| X | 89 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 97 | - | - | - | - | - | - | - | - | - | - | - | - | - | 260 | | | 13 |
| | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 320 | | | 16 |

| % Plants Showing | Moderate Use | Heavy Use | Poor Vigor | %Change |
|---|---|---|---|---|
| '89 | 07% | 07% | 07% | -68% |
| '97 | 38% | 13% | 13% | +38% |
| '02 | 31% | 23% | 23% | |

| Total Plants/Acre (excluding Dead & Seedlings) | | | | |
|---|---|---|---|---|
| '89 | 499 | Dec: | | 47% |
| '97 | 160 | | | 50% |
| '02 | 260 | | | 38% |

| AGE | YR | Form Class (No. of Plants) 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Vigor Class 1 | 2 | 3 | 4 | Plants Per Acre | Average (inches) Ht. | Cr. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cercocarpus montanus | | | | | | | | | | | | | | | | | | |
| S | 89 | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | 33 | | | 1 |
| | 97 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| Y | 89 | 6 | - | - | - | - | - | - | - | - | 6 | - | - | - | 200 | | | 6 |
| | 97 | 2 | - | - | - | - | 1 | - | - | - | 3 | - | - | - | 60 | | | 3 |
| | 02 | - | - | 2 | - | - | - | - | - | - | 2 | - | - | - | 40 | | | 2 |
| M | 89 | - | - | 10 | - | - | - | - | - | - | 10 | - | - | - | 333 | 67 | 79 | 10 |
| | 97 | 1 | 2 | 4 | 1 | 7 | 6 | - | - | - | 21 | - | - | - | 420 | 33 | 29 | 21 |
| | 02 | 6 | 1 | 16 | - | 2 | - | - | - | - | 24 | - | 1 | - | 500 | 31 | 26 | 25 |
| D | 89 | - | 1 | 2 | - | - | - | - | - | - | 2 | - | 1 | - | 100 | | | 3 |
| | 97 | - | - | - | 1 | 1 | 1 | - | - | - | 3 | - | - | - | 60 | | | 3 |
| | 02 | - | - | 6 | - | - | 2 | - | - | - | 5 | - | 1 | 2 | 160 | | | 8 |
| X | 89 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 97 | - | - | - | - | - | - | - | - | - | - | - | - | - | 20 | | | 1 |
| | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 20 | | | 1 |

| % Plants Showing | Moderate Use | Heavy Use | Poor Vigor | %Change |
|---|---|---|---|---|
| '89 | 05% | 63% | 05% | -15% |
| '97 | 37% | 44% | 00% | +23% |
| '02 | 09% | 74% | 11% | |

| Total Plants/Acre (excluding Dead & Seedlings) | | | | |
|---|---|---|---|---|
| '89 | 633 | Dec: | | 16% |
| '97 | 540 | | | 11% |
| '02 | 700 | | | 23% |

| Chrysothamnus nauseosus albicaulis | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Y | 89 | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | 33 | | | 1 |
| | 97 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 02 | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | 20 | | | 1 |
| M | 89 | 1 | - | 1 | - | - | - | - | - | - | 2 | - | - | - | 66 | 35 | 22 | 2 |
| | 97 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | 24 | 23 | 0 |
| | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | 24 | 23 | 0 |
| D | 89 | 1 | 1 | 1 | - | - | - | - | - | - | 3 | - | - | - | 100 | | | 3 |
| | 97 | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | 20 | | | 1 |
| | 02 | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | 20 | | | 1 |

| % Plants Showing | Moderate Use | Heavy Use | Poor Vigor | %Change |
|---|---|---|---|---|
| '89 | 17% | 33% | 00% | -90% |
| '97 | 00% | 00% | 00% | +50% |
| '02 | 00% | 00% | 00% | |

| Total Plants/Acre (excluding Dead & Seedlings) | | | | |
|---|---|---|---|---|
| '89 | 199 | Dec: | | 50% |
| '97 | 20 | | | 100% |
| '02 | 40 | | | 50% |

| AGE | YR | Form Class (No. of Plants) 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Vigor Class 1 | 2 | 3 | 4 | Plants Per Acre | Average (inches) Ht. | Cr. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chrysothamnus viscidiflorus viscidiflorus | | | | | | | | | | | | | | | | | | |
| Y | 89 | 27 | - | - | 4 | - | - | - | - | - | 31 | - | - | - | 1033 | | | 31 |
| | 97 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 02 | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | 20 | | | 1 |
| M | 89 | 20 | - | - | - | - | - | 1 | - | - | 21 | - | - | - | 700 | 18 | 24 | 21 |
| | 97 | 5 | - | - | - | - | - | - | - | - | 5 | - | - | - | 100 | 12 | 12 | 5 |
| | 02 | 9 | 4 | - | - | - | - | - | - | - | 10 | 3 | - | - | 260 | 11 | 16 | 13 |
| D | 89 | 7 | - | - | - | - | - | - | - | - | 7 | - | - | - | 233 | | | 7 |
| | 97 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |

| % Plants Showing | Moderate Use | Heavy Use | Poor Vigor | %Change |
|---|---|---|---|---|
| '89 | 00% | 00% | 00% | -95% |
| '97 | 00% | 00% | 00% | +64% |
| '02 | 29% | 00% | 00% | |

| Total Plants/Acre (excluding Dead & Seedlings) | | | | |
|---|---|---|---|---|
| '89 | 1966 | Dec: | | 12% |
| '97 | 100 | | | 0% |
| '02 | 280 | | | 0% |

| Juniperus osteosperma | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S | 89 | - | - | - | 1 | - | - | - | - | - | 1 | - | - | - | 33 | | | 1 |
| | 97 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 02 | 2 | - | - | - | - | - | - | - | - | 2 | - | - | - | 40 | | | 2 |
| Y | 89 | 1 | - | - | 1 | - | - | - | - | - | 2 | - | - | - | 66 | | | 2 |
| | 97 | 6 | - | - | - | - | - | - | - | - | 6 | - | - | - | 120 | | | 6 |
| | 02 | 4 | - | - | - | - | - | - | - | - | 3 | - | 1 | - | 80 | | | 4 |
| M | 89 | - | - | - | - | - | - | - | - | 1 | 1 | - | - | - | 33 | 197 | 122 | 1 |
| | 97 | 4 | - | - | - | - | - | - | 1 | - | 5 | - | - | - | 100 | 3 | 5 | 5 |
| | 02 | 6 | - | - | - | - | - | - | 1 | - | 6 | - | 1 | - | 160 | - | - | 8 |
| D | 89 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 97 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 02 | 2 | - | - | - | - | - | - | - | - | - | - | 1 | 1 | 40 | | | 2 |

| % Plants Showing | Moderate Use | Heavy Use | Poor Vigor | %Change |
|---|---|---|---|---|
| '89 | 00% | 33% | 00% | +55% |
| '97 | 00% | 00% | 00% | +21% |
| '02 | 00% | 00% | 29% | |

| Total Plants/Acre (excluding Dead & Seedlings) | | | | |
|---|---|---|---|---|
| '89 | 99 | Dec: | | 0% |
| '97 | 220 | | | 0% |
| '02 | 280 | | | 14% |

| Mahonia repens | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 89 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | - | - | 0 |
| | 97 | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | 20 | 3 | 5 | 1 |
| | 02 | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | 20 | 2 | 3 | 1 |

| % Plants Showing | Moderate Use | Heavy Use | Poor Vigor | %Change |
|---|---|---|---|---|
| '89 | 00% | 00% | 00% | |
| '97 | 00% | 00% | 00% | + 0% |
| '02 | 00% | 00% | 00% | |

| Total Plants/Acre (excluding Dead & Seedlings) | | | | |
|---|---|---|---|---|
| '89 | 0 | Dec: | | - |
| '97 | 20 | | | - |
| '02 | 20 | | | - |

| AGE | YR | Form Class (No. of Plants) 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Vigor Class 1 | 2 | 3 | 4 | Plants Per Acre | Average (inches) Ht. | Cr. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Opuntia spp. | | | | | | | | | | | | | | | | | | |
| Y | 89 | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | 33 | | | 1 |
| | 97 | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | 20 | | | 1 |
| | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| M | 89 | 2 | - | - | - | - | - | - | - | - | 2 | - | - | - | 66 | 5 | 6 | 2 |
| | 97 | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | 20 | 5 | 7 | 1 |
| | 02 | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | 20 | 6 | 16 | 1 |
| D | 89 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 97 | 1 | - | - | - | - | - | - | - | - | - | - | - | 1 | 20 | | | 1 |
| | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| X | 89 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 97 | - | - | - | - | - | - | - | - | - | - | - | - | - | 20 | | | 1 |
| | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |

| % Plants Showing | Moderate Use | Heavy Use | Poor Vigor | %Change |
|---|---|---|---|---|
| '89 | 00% | 00% | 00% | |
| '97 | 00% | 00% | 33% | -39% |
| '02 | 00% | 00% | 00% | -67% |

| Total Plants/Acre (excluding Dead & Seedlings) | | | | |
|---|---|---|---|---|
| | '89 | 99 | Dec: | 0% |
| | '97 | 60 | | 33% |
| | '02 | 20 | | 0% |

Pinus edulis

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Y | 89 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 97 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 02 | 1 | - | - | 1 | - | - | - | - | - | 2 | - | - | - | 40 | | | 2 |

| % Plants Showing | Moderate Use | Heavy Use | Poor Vigor | %Change |
|---|---|---|---|---|
| '89 | 00% | 00% | 00% | |
| '97 | 00% | 00% | 00% | |
| '02 | 00% | 00% | 00% | |

| Total Plants/Acre (excluding Dead & Seedlings) | | | | |
|---|---|---|---|---|
| | '89 | 0 | Dec: | - |
| | '97 | 0 | | - |
| | '02 | 40 | | - |

Purshia tridentata

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 89 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | - | - | 0 |
| | 97 | - | 1 | - | - | - | - | - | - | - | 1 | - | - | - | 20 | 12 | 24 | 1 |
| | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | 13 | 33 | 0 |
| X | 89 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 97 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 20 | | | 1 |

| % Plants Showing | Moderate Use | Heavy Use | Poor Vigor | %Change |
|---|---|---|---|---|
| '89 | 00% | 00% | 00% | |
| '97 | 100% | 00% | 00% | |
| '02 | 00% | 00% | 00% | |

| Total Plants/Acre (excluding Dead & Seedlings) | | | | |
|---|---|---|---|---|
| | '89 | 0 | Dec: | - |
| | '97 | 20 | | - |
| | '02 | 0 | | - |

| AGE | YR | Form Class (No. of Plants) 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Vigor Class 1 | 2 | 3 | 4 | Plants Per Acre | Average (inches) Ht. | Cr. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quercus gambelii | | | | | | | | | | | | | | | | | | |
| S | 89 | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | 33 | | | 1 |
| | 97 | 2 | - | - | - | - | - | - | - | - | 2 | - | - | - | 40 | | | 2 |
| | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| Y | 89 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 97 | 7 | 6 | - | 1 | - | - | - | - | - | 14 | - | - | - | 280 | | | 14 |
| | 02 | 4 | - | - | 2 | - | - | - | - | - | 6 | - | - | - | 120 | | | 6 |
| M | 89 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | - | - | 0 |
| | 97 | 20 | 3 | - | - | - | - | 3 | - | - | 26 | - | - | - | 520 | 49 | 29 | 26 |
| | 02 | 23 | 12 | - | 7 | - | - | - | - | - | 35 | - | 7 | - | 840 | 33 | 18 | 42 |
| D | 89 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 97 | - | 1 | - | - | - | - | - | - | - | 1 | - | - | - | 20 | | | 1 |
| | 02 | 2 | - | - | - | - | - | - | - | - | - | - | 1 | 1 | 40 | | | 2 |
| X | 89 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 97 | - | - | - | - | - | - | - | - | - | - | - | - | - | 60 | | | 3 |
| | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 160 | | | 8 |

| % Plants Showing | Moderate Use | Heavy Use | Poor Vigor | %Change |
|---|---|---|---|---|
| '89 | 00% | 00% | 00% | |
| '97 | 24% | 00% | 00% | +18% |
| '02 | 24% | 00% | 18% | |

| Total Plants/Acre (excluding Dead & Seedlings) | | | | |
|---|---|---|---|---|
| | '89 | 0 | Dec: | 0% |
| | '97 | 820 | | 2% |
| | '02 | 1000 | | 4% |

Ribes spp.

| AGE | YR | Form Class (No. of Plants) 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Vigor Class 1 | 2 | 3 | 4 | Plants Per Acre | Average (inches) Ht. | Cr. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Y | 89 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 97 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 02 | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | 20 | | | 1 |
| M | 89 | - | - | - | - | 2 | - | - | - | - | 2 | - | - | - | 66 | 18 | 22 | 2 |
| | 97 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | - | - | 0 |
| | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | - | - | 0 |

| % Plants Showing | Moderate Use | Heavy Use | Poor Vigor | %Change |
|---|---|---|---|---|
| '89 | 100% | 00% | 00% | |
| '97 | 00% | 00% | 00% | |
| '02 | 00% | 00% | 00% | |

| Total Plants/Acre (excluding Dead & Seedlings) | | | | |
|---|---|---|---|---|
| | '89 | 66 | Dec: | - |
| | '97 | 0 | | - |
| | '02 | 20 | | - |

| AGE | YR | Form Class (No. of Plants) 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Vigor Class 1 | 2 | 3 | 4 | Plants Per Acre | Average (inches) Ht. | Cr. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rosa woodsii | | | | | | | | | | | | | | | | | | |
| S | 89 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 97 | 4 | - | - | - | - | - | - | - | - | 4 | - | - | - | 80 | | | 4 |
| | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| Y | 89 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 97 | 12 | - | - | 11 | - | - | - | - | - | 23 | - | - | - | 460 | | | 23 |
| | 02 | 7 | - | - | 7 | - | - | - | - | - | 14 | - | - | - | 280 | | | 14 |
| M | 89 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | - | - | 0 |
| | 97 | 4 | - | - | 5 | - | - | - | - | - | 9 | - | - | - | 180 | 22 | 14 | 9 |
| | 02 | 6 | - | - | - | - | - | - | - | - | 6 | - | - | - | 120 | 6 | 6 | 6 |
| D | 89 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 97 | - | - | - | - | - | 1 | - | - | - | 1 | - | - | - | 20 | | | 1 |
| | 02 | 1 | - | - | - | - | - | - | - | - | - | - | - | 1 | 20 | | | 1 |

| % Plants Showing | Moderate Use | Heavy Use | Poor Vigor | %Change |
|---|---|---|---|---|
| '89 | 00% | 00% | 00% | |
| '97 | 00% | 03% | 00% | -36% |
| '02 | 00% | 00% | 05% | |

| Total Plants/Acre (excluding Dead & Seedlings) | | | | |
|---|---|---|---|---|
| | '89 | 0 | Dec: | 0% |
| | '97 | 660 | | 3% |
| | '02 | 420 | | 5% |

| Symphoricarpos oreophilus | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S | 89 | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | 33 | | | 1 |
| | 97 | 3 | 4 | - | - | - | - | - | - | - | 6 | - | - | 1 | 140 | | | 7 |
| | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| Y | 89 | 8 | 2 | 1 | - | - | - | 12 | - | - | 23 | - | - | - | 766 | | | 23 |
| | 97 | 29 | - | - | - | - | - | - | - | - | 29 | - | - | - | 580 | | | 29 |
| | 02 | 12 | - | - | - | - | - | - | - | - | 12 | - | - | - | 240 | | | 12 |
| M | 89 | 36 | 21 | 5 | 33 | 6 | - | 15 | - | - | 116 | - | - | - | 3866 | 20 | 26 | 116 |
| | 97 | 148 | 40 | 11 | 37 | - | - | - | - | - | 236 | - | - | - | 4720 | 43 | 62 | 236 |
| | 02 | 240 | 17 | 25 | - | - | - | - | - | - | 267 | 15 | - | - | 5640 | 18 | 35 | 282 |
| D | 89 | - | 2 | 1 | - | - | - | - | - | - | 3 | - | - | - | 100 | | | 3 |
| | 97 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 02 | 14 | - | 2 | - | - | - | - | - | - | 11 | - | - | 5 | 320 | | | 16 |
| X | 89 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | | | 0 |
| | 97 | - | - | - | - | - | - | - | - | - | - | - | - | - | 80 | | | 4 |
| | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 40 | | | 2 |

| % Plants Showing | Moderate Use | Heavy Use | Poor Vigor | %Change |
|---|---|---|---|---|
| '89 | 22% | 05% | 00% | +11% |
| '97 | 15% | 04% | 00% | +15% |
| '02 | 05% | 09% | 02% | |

| Total Plants/Acre (excluding Dead & Seedlings) | | | | |
|---|---|---|---|---|
| | '89 | 4732 | Dec: | 2% |
| | '97 | 5300 | | 0% |
| | '02 | 6200 | | 5% |

| AGE | YR | Form Class (No. of Plants) 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Vigor Class 1 | 2 | 3 | 4 | Plants Per Acre | Average (inches) Ht. | Cr. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tetradymia canescens | | | | | | | | | | | | | | | | | | |
| M | 89 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | - | - | 0 |
| | 97 | - | 3 | - | - | - | - | - | - | - | - | 3 | - | - | 60 | 13 | 11 | 3 |
| | 02 | 3 | - | - | - | - | - | - | - | - | 2 | 1 | - | - | 60 | 13 | 16 | 3 |

| % Plants Showing | Moderate Use | Heavy Use | Poor Vigor | %Change |
|---|---|---|---|---|
| '89 | 00% | 00% | 00% | |
| '97 | 100% | 00% | 00% | + 0% |
| '02 | 00% | 00% | 00% | |

| Total Plants/Acre (excluding Dead & Seedlings) | | | | |
|---|---|---|---|---|
| | '89 | 0 | Dec: | - |
| | '97 | 60 | | - |
| | '02 | 60 | | - |